REMARKS

In the Office Action mailed April 23, 2008, the Examiner rejected all pending claims 1, 4-27, 30, and 31. In view of the following remarks, Applicants respectfully request reconsideration and allowance of all pending claims.

Claim Rejections under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 1 and 4-27 under 35 U.S.C. § 103(a) as obvious over Pieper et al. (U.S. Patent No. 5,825,908) in view of Golay et al. (U.S. Patent No. 7,071689). Further, the Examiner rejected claims 30 and 31 under 35 U.S.C. § 103(a) as being obvious over Pieper and Golay further in view of Geiser et al. (U.S. Patent No. 6,106,470). Applicants respectfully traverse these rejections.

Legal Precedent

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). To establish a *prima facie* case, the Examiner must show that the combination includes *all* of the claimed elements, *and* also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). The Examiner must provide objective evidence, rather than subjective belief and unknown authority, of the requisite motivation or suggestion to combine or modify the cited references. *In re Lee*, 61 U.S.P.Q.2d. 1430 (Fed. Cir. 2002). Further, the Supreme Court has recently stated that the obviousness analysis should be explicit. *See KSR Int'l Co. v. Teleflex, Inc.*, 82 U.S.P.Q.2d 1385 (U.S. 2007) ("[R]ejections based on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.") (quoting *In re Kahn*, 441 F.3d 977,988 (Fed. Cir. 2006)).

Further, during patent examination, the pending claims must be given an interpretation that is reasonable and consistent with the specification. *See In re Prater*, 415 F.2d 1393, 1404-

05, 162 U.S.P.Q. 541, 550-51 (C.C.P.A. 1969); *see also* M.P.E.P. §§ 608.01(o) and 2111. Indeed, the specification is "the primary basis for construing the claims." *See Phillips v. AWH Corp.*, 75 U.S.P.Q.2d 1321, 1326 (Fed. Cir. 2005). One should rely heavily on the written description for guidance as to the meaning of the claims. *See id.*

Brief Summary of Present Application

In accordance with embodiments of the present technique, a navigational tool may be provided for selection of images in a series of images. *See* Specification, ¶ [0007]. For example, in medical imaging, a large number of images (e.g., hundreds or thousands of images) may be acquired in a single imaging session or in multiple imaging sessions over time. *See* ¶¶ [0002]-[0004]. Cine mode viewing of these images may be excessively time-consuming. *See* ¶ [0005].

A navigational tool in accordance with embodiments of the present technique may include a scout tool which illustrates the amount of change from one image to the next. *See* Specification, ¶ [0041]. The amount of change may be represented by a difference index, which may be computed using various mathematical techniques. *See* ¶ [0042]. The scout tool may be illustrated as a graph in which the difference index between consecutive (e.g., spatially or chronologically adjacent) pairs of slices is charted. *See* ¶ [0045]; FIG. 6. A caregiver may use the scout image to determine which images show the most relative variance, which may indicate an anomaly in the images. *See* ¶ [0038]. Furthermore, the caregiver may access the images of interest by using a virtual tool to move directly to the images corresponding to the desired relative variance. *See* ¶ [0045].

Deficiencies of the Rejection of Independent Claim 1

Accordingly, independent claim 1 recites, *inter alia*, "calculating a level of change of the image data from one image to the next in the plurality of images; and presenting a viewer with the calculated levels of change of the image data for the plurality of images." (Emphasis added).

In sharp contrast, the Pieper reference discloses a system for scrolling through a series of images and switching between axial, coronal, and sagittal views of an imaged object. Rather than teaching the claimed method for processing image data, the Pieper reference is an example of the extremely time-consuming image review method which the present technique aims to avoid or improve. Specifically, the Pieper reference provides a system for scrolling through images in three dimensions but does not provide any reference for determining which images may be of most interest to a caregiver. *See, e.g.,* Pieper, col. 13, lines 12-22.

In the Office Action, the Examiner stated that "Pieper does not explicitly disclose calculating a level of change of the imaged data from one image to the next." Office Action, page 4 (emphasis in original). However, the Examiner then argues incorrectly that merely reconstructing a slice image constitutes "an indicia presented to the user indicating calculated levels of change." Office Action, page 4. Applicants respectfully stress that this argument is nonsensical. Moreover, the Examiner is apparently misinterpreting claim 1 in asserting that Pieper teaches calculated levels of change, especially in view of the plain language of claim 1 and in view of the present specification.

To be sure, the present claim is directed to calculating a difference between two or more images; therefore, displaying only one of the images clearly cannot constitute "presenting a viewer with the calculated levels of change" as recited in independent claim 1. Put another way, in order to calculate change in image data from one image to the next, the image data must already exist. The suggestion that generating the image data (i.e., reconstructing the image) constitutes calculating the change in the image data is clearly a circular argument.

The Examiner further cited the Golay reference "to teach an explicit calculation of changes levels and presentation of calculated change levels between each slice (Fig. 5D and column 15, lines 5-25.)" Office Action, page 4. Contrary to the Examiner's assertion, the Golay reference does not disclose calculating a level of change as recited in the present claim. Rather, the Golay reference illustrates "the SNR [signal-to-noise ratio] (normalized over the number of

voxels) of different slices in the three data sets." Golay, col. 15, lines 12-14. The three data sets include images taken in an ascending-slice acquisition order (FIG. 5A), a descending-slice acquisition order (FIG. 5B), and combination thereof (FIG. 5C). Golay, col. 15, lines 5-7; *see also* col. 12, lines 25-33. That is, the third set of image slices constitutes a combination or sum of the first and second sets of image slices. The chart illustrated in FIG. 5D illustrates the signal-to-noise ratio of the three data sets. There is no indication, nor does it make sense, that the signal-to-noise ratio constitutes a calculated level of change between images as recited in the present claim.

Accordingly, the cited references, whether taken alone or in combination, teach or suggest calculating a level of change between images and presenting the calculated levels of change as recited in independent claim 1. The Examiner has therefore not set forth a *prima facie* case of obviousness regarding independent claim 1. For at least these reasons, the rejection of independent claim 1 under 35 U.S.C. § 103 is defective and, therefore, should be withdrawn. Applicants respectfully request the Examiner allow independent claim 1 and its dependent claims.

Deficiencies of the Rejection of Independent Claim 9

Similarly, independent claim 9 recites, *inter alia*, "generating a scout navigation tool by quantifying a level of change of the image data from one reconstructed image to the next in the plurality of reconstructed images, the scout navigation tool including a graphical representation of progressive change between reconstructed images of the plurality of reconstructed images and a virtual tool for navigating through the plurality of reconstructed images based upon the level of change." (Emphasis added).

As discussed above in reference to claim 1, nothing in the Pieper reference discloses quantifying a level of change between images as recited in the present claim. In addition, in rejecting independent claim 9, the Examiner asserted confusingly that a reconstructed image slice is "interpreted as a graphical representation of progressive change." Office Action, page 8. Again, the Examiner's interpretation of the Pieper reference is clearly erroneous. The Examiner

seems to be arguing that showing two different images in succession constitutes a graphical representation of the differences between those images. As discussed above, the Pieper reference does not disclose quantifying, calculating, computing, describing, stating, or in any way *characterizing* the level of change between images. Accordingly, nothing in the Pieper reference discloses or suggests generating a graphical representation of the quantified level of change between images as recited in the present claim. Furthermore, the Examiner has not cited anything graphical in the Pieper reference which could be construed as the graphical representation. The Examiner's assertion that scrolling through a series of images is equivalent to generating a graphical representation of the level of change between the images cannot be sustained.

In addition, as discussed above, the Golay reference does not disclose quantifying a level of change as recited in the present claim. Rather, the Golay reference discloses combining two sets of images to generate a third set and determining the signal-to-noise-ratio for the three sets. The graph illustrated in FIG. 5D of Golay is a graph of the signal-to-noise ratios for the three sets and not a "graphical representation of progressive change between reconstructed images" as recited in the present claim.

Again, neither of the cited references, nor a hypothetical combination thereof, discloses quantifying a level of change between images and generating a graphical representation of progressive change as recited in independent claim 9. The Examiner has therefore not set forth a *prima facie* case of obviousness regarding independent claim 9. For at least these reasons, the rejection of independent claim 9 under 35 U.S.C. § 103 is defective and, therefore, should be withdrawn. Applicants respectfully request the Examiner allow independent claim 9 and its dependent claims.

Deficiencies of the Rejection of Independent Claim 20

Independent claim 20 recites, *inter alia*, "processing circuitry configured to compare image data representative of a plurality of images acquired via a medical imaging system and not as video, and to generate a scout navigation tool by computing a level of change of the image data from one

image to the next in the plurality of images, the scout navigation tool including a graphical representation of progressive change between images of the plurality of images and a virtual tool for navigating through the plurality of images based upon the level of change." (Emphasis added)

As discussed above, the Examiner's interpretation of the Pieper and Golay references are clearly erroneous. Scrolling through a series of images, as taught by Pieper, and graphing the signal-to-noise ratio for slides, as taught by Golay, does not suggest circuitry configured to generate a graphical representation of computed levels of change between images as recited in the present claim. The Examiner has therefore not set forth a *prima facie* case of obviousness regarding independent claim 9. For at least these reasons, the rejection of independent claim 20 under 35 U.S.C. § 103 is defective and, therefore, should be withdrawn. Applicants respectfully request the Examiner allow independent claim 20 and its dependent claims.

Deficiencies of the Rejection of Independent Claim 24

Independent claim 24 recites, *inter alia*, "means for calculating a level of change of the image data from one image to the next in the plurality of images; and means for presenting a viewer with the calculated levels of change of the image data for the plurality of images." (Emphasis added).

As in the previously-filed Response and Amendment Accompanying Request for Continued Examination, Applicants again stress that independent claim 24 includes means-plus-function language, as set forth in 35 U.S.C. § 112, paragraph 6, and should be examined in accordance with this body of law. As may be appreciated, with respect to 35 U.S.C. § 112, paragraph 6, an Examiner "may not disregard the structure disclosed in the specification corresponding to such language when rendering a patentability determination." *In re Donaldson Co.*, 29 U.S.P.Q.2d 1845 (Fed. Cir. 1994); *see also* Manual of Patent Examining Procedure § 2181. Applicants respectfully note that the present rejection does not comport with the controlling case law or M.P.E.P. sections and is, therefore, deficient. Accordingly, the Examiner

has failed to establish a *prima facie* case of unpatentability in accordance with the relevant statutory and precedential authority outlined above.

Furthermore, as discussed above, the Examiner's rejection of independent claim 24 is based on an flawed interpretation of the Pieper reference. Specifically, nothing in the Pieper reference discloses or anticipates any means for calculating the level of change between images as recited in the present claim. Clearly, therefore, the viewer cannot be presented with the calculated levels of change. In addition, the Golay reference clearly does not obviate the deficiencies of the Pieper reference as it also does not disclose calculating the level of change between images. Rather, the Golay reference discloses calculating the signal-to-noise ratio for three sets of images, one of which is a combination of the other two. Moreover, the Examiner is apparently ignoring legal precedent (i.e., the *Phillips* case discussed above) in incorrectly interpreting the present claims. In sum, the Examiner has therefore not set forth a *prima facie* case of obviousness regarding independent claim 24. For at least these reasons, the rejection of independent claim 24 under 35 U.S.C. § 103 should be withdrawn. Applicants respectfully request the Examiner allow independent claim 24.

Deficiencies of the Rejection of Independent Claim 25

Independent claim 25 recites, *inter alia*, "means for generating a scout navigation tool by quantifying a level of change of the image data from one image to the next in the plurality of images, the scout navigation tool including a graphical representation of progressive change between images of the plurality of images." (Emphasis added).

As with independent claim 24, independent claim 25 includes means-plus-function language, as set forth in 35 U.S.C. § 112, paragraph 6. Accordingly, claim 25 should be examined in accordance with that body of law, as set forth in the controlling case law and M.P.E.P. sections. As the Examiner has not performed the required analysis, the Examiner has failed to establish a *prima facie* case of unpatentability in accordance with the relevant statutory and precedential authority outlined above.

Furthermore, as discussed above, the Pieper and Golay references clearly do not disclose all of the elements recited in independent claim 25. The cited references do not teach or suggest means for generating a graphical representation of quantified levels of change between images in a series as recited in the present claim. The Examiner has therefore not set forth a *prima facie* case of obviousness regarding independent claim 25. For at least these reasons, the rejection of independent claim 25 under 35 U.S.C. § 103 is defective and, therefore, should be withdrawn. Applicants respectfully request the Examiner allow independent claim 25.

Deficiencies of the Rejection of Independent Claim 26

Independent claim 26 recites, *inter alia*, "code stored on the at least one computer readable medium encoding routines for ... calculating a level of change of the image data from one image to the next in the plurality of images, and presenting a viewer with the calculated levels of change of the image data for the plurality of images." (Emphasis added).

As discussed above, the Examiner's interpretation of the Pieper and Golay references are clearly erroneous. The cited references do not disclose "calculating a level of change of the image data from one image to the next" as recited in the present claim and therefore clearly cannot disclose code for performing such an action. Furthermore, as no levels of change are calculated, such calculated levels of change cannot be presented to the viewer as recited in the present claim. The Examiner has therefore not set forth a *prima facie* case of obviousness regarding independent claim 26. For at least these reasons, the rejection of independent claim 26 under 35 U.S.C. § 103 is defective and, therefore, should be withdrawn. Applicants respectfully request the Examiner allow independent claim 26.

Deficiencies of the Rejection of Independent Claim 27

Independent claim 27 recites, *inter alia*, "code stored on the at least one computer readable medium encoding routines for ... generating a scout navigation tool by computing a level of change of the image data from one image to the next in the plurality of images, the scout

navigation tool including a graphical representation of progressive change between images of the plurality of images." (Emphasis added).

Again, the Examiner's rejection of independent claim 27 based on the Pieper and Golay references cannot be sustained. The Pieper reference clearly does not teach or disclose computation of the levels of change between images nor graphical representation of such computations. The Golay reference does not obviate the deficiencies of the Pieper reference as the slices in the Golay reference are combined, and no level of change between the slices is computed or graphed. The Examiner has therefore not set forth a *prima facie* case of obviousness regarding independent claim 27. For at least these reasons, the rejection of independent claim 27 under 35 U.S.C. § 103 is defective and, therefore, should be withdrawn. Applicants respectfully request the Examiner allow independent claim 27.

Deficiencies of the Rejection of Dependent Claims 4 and 17

Applicants believe that the dependent claims rejected under U.S.C. § 103(a) depend from allowable based claims, as discussed above, and are therefore allowable for at least this reason. In addition, the rejected dependent claims recite unique features which are not found in the cited references. Referring now to dependent claims 4 and 17, these claims recite, "analyzing absolute differences between adjacent images in the plurality of images" and "determining absolute differences between adjacent reconstructed images in the plurality of reconstructed images," respectively. (Emphasis added).

In the Office Action, the Examiner stated that, in order to generate a 3D model as in the Pieper reference, "[t]he content of the 3D model between each slice must be interpolated or at the very least guessed." Office Action, page 4; *see also* pages 10-11. The absolute differences are therefore "compared between each pair of slices in order to create the 3D model and reconstructed 3D surface." *Id.* This reasoning is clearly erroneous as interpolation would not work if considering only the absolute differences between slices.

As one of skill in the art will appreciate, an absolute value is a value that has a magnitude but no direction. Even assuming, *arguendo*, that the Examiner's reasoning regarding the Pieper reference was not circular, as discussed above, there is clearly no disclosure of determining an absolute difference between images. For example, in order to interpolate an image between two other images, the *magnitude* and *direction* of the differences between the images must be determined. That is, merely determining the absolute difference between two images will not enable an interpolation between the images. If an area on a first image is bright and the corresponding area on a second image is dark, the difference between the images must be subtracted from the first image to generate an interpolation between the images. If only the absolute difference between the images is determined, there is no indication of whether the difference should be added or subtracted. Accordingly, implied interpolation to generate a 3D image does not disclose calculating an absolute difference between image slices as recited in the present claims.

The Examiner has therefore not set forth a *prima facie* case of obviousness regarding dependent claims 4 and 17. For at least these reasons, the rejection of dependent claims 4 and 17 under 35 U.S.C. § 103 is defective and, therefore, should be withdrawn. Applicants respectfully request the Examiner allow dependent claims 4 and 17.

Deficiencies of the Rejection of Dependent Claims 30 and 31

Again, Applicants believe that the dependent claims rejected under U.S.C. § 103(a) depend from allowable based claims, and are therefore allowable for at least this reason. Referring now to dependent claims 30 and 31, these claims generally recite calculating an absolute value of a difference between images and summing or accumulating the absolute values of the differences to determine a difference index for the images.

In rejecting claims 30 and 31, the Examiner stated that the Golay reference "teaches wherein the absolute differences are used to create an index of differences between adjacent images or slices (Fig. 5d)." Office Action, page 18. As discussed above, the Golay reference does not disclose calculating any differences between images. Rather, two sets of images in the

Golay reference are combined to produce a new set of images. *See* Golay, col. 15, lines 5-7; *see also* col. 12, lines 25-33. The graph in FIG. 5D is a comparison of the signal-to-noise ratios for the three sets of images. *See* col. 15, lines 12-14.

Furthermore, nothing in the Geiser reference obviates the deficiencies of the Pieper and Golay references. Rather, the Geiser reference discloses a method for determining the distance between ultrasound slices then using that information to register collected data and reconstruct a three-dimensional image. *See* Geiser, Abstract.

The Examiner has therefore not set forth a *prima facie* case of obviousness regarding dependent claims 30 and 31. For at least these reasons, the rejection of dependent claims 30 and 31 under 35 U.S.C. § 103 is defective and, therefore, should be withdrawn. Applicants respectfully request the Examiner allow dependent claims 30 and 31.

Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

Date: August 25, 2008

/Floron C. Faries/

Floron C. Faries
Reg. No. 59,991
FLETCHER YODER
P.O. Box 692289
Houston, TX 77269-2289
(281) 970-4545